

FOREST PLAN MONITORING MATRIX
I. STATUS OF SELECT WATERSHED CONDITIONS

Condition	Objective	Questions	Indicators/Sources
1 Public water-supply reservoir	To determine effectiveness of applying best management practices and Forest Plan standards and guidelines in restoring water-supply watersheds and protecting drinking-water reservoirs.	Is upstream agricultural runoff being mitigated? Is water quality being maintained/improved?	Miles or acres of streambank or gully erosion repaired. IEPA water quality reports
2 Water quality	To determine effectiveness of applying best management practices and Forest Plan standards and guidelines in protecting water quality of streams, lakes and ponds.	Is water quality being maintained/improved?	Miles or acres of streambank or gully erosion repaired. IEPA water quality reports
3 Water quantity	To determine effectiveness of applying best management practices and Forest Plan standards and guidelines in improving or maintaining stream-channel structure and natural stream-flow regime.	How many miles/acres of stream-channel or watershed have been improved? Water flow un-impeded?	Miles, acres treated, including with NRCS partnership
4 Aquatic biota	To determine effectiveness of applying best management practices in maintaining, restoring, or enhancing aquatic habitat with respect to fragmentation, large woody debris and channel shape and function.	What is the species distribution in sampled streams, ponds, lakes?	Sampling data
5 Riparian/wetland vegetation	To determine effectiveness of applying best management practices and Forest Plan standards and guidelines in protecting, maintaining, restoring, or enhancing native riparian vegetation along streams, waterbodies, or wetlands.	Is native vegetation maintaining dominance near waterbodies, streams or wetlands?	Sampling data

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6 Travelways	To determine effectiveness of applying best management practices and Forest Plan standards and guidelines in maintaining, locating, or restoring trails and roadways.	Are travelways located and maintained to prevent erosion?	Miles of roads, trails de-commissioned, improved, maintained.
7 Soils	To determine effectiveness of applying best management practices and Forest Plan standards and guidelines in preventing or abating erosion.	Is soil protected during management, recreation activities?	Level of erosion abatement, mitigation, prevention
II. STATUS OF SELECT ECOLOGICAL CONDITIONS INCLUDING KEY CHARACTERISTICS OF TERRESTRIAL AND AQUATIC ECOSYSTEMS			
Condition	Objective	Questions	Indicators/Sources
8 Aquatic habitat quality	To determine effectiveness of applying best management practices in maintaining, restoring, or enhancing aquatic habitat with respect to fragmentation, large woody debris and channel shape and function.	What is the species distribution in sampled streams, ponds, lakes?	Sampling data
9 Mississippi River bottomland hydrologic regime	To determine effectiveness of applying best management practices and Forest Plan standards and guidelines in restoring, protecting wetland habitat, hydrology, and wetland functions in the Mississippi bottomlands.	How many acres have improved wetland characteristics?	Acres of wetlands restored, improved, maintained
10 Natural areas' unique features	To determine effectiveness of management activities and Forest Plan standards and guidelines in protecting and restoring rare ecosystems and communities.	Are natural area characteristics being conserved?	Reports from Forest Service, researchers, cooperating agencies and others regarding habitat condition.
11 Fire-adapted communities	To determine effectiveness of applying best management practices and Forest Plan standards and guidelines in restoring and maintaining fire-adapted communities.	How many acres are under burning prescriptions? Are fire-adapted communities being conserved?	Acres, oak regeneration plots

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12 Species richness	To determine effectiveness of applying best management practices and Forest Plan standards and guidelines in maintaining or improving species richness in Forest habitat-types.		
III. STATUS OF FOCAL SPECIES TO ASSESS ECOLOGICAL CONDITIONS			
Focal Species	Objective	Questions	Indicators/Sources
13 Pileated woodpecker Red-headed woodpecker Prothonotary warbler	Serve as indicators of health of upland and bottomland central hardwood oak-hickory forests.	What are the population trends for these species?	Survey data
IV. STATUS OF SELECT SET OF ECOLOGICAL CONDITIONS TO CONTRIBUTE TO RECOVERY OF AT-RISK SPECIES (FEDERALLY LISTED, REGIONAL FORESTER SENSITIVE, SPECIES WITH VIABILITY EVALUATION)			
Condition	Objective	Questions	Indicators/Sources
14 Barrens, glades, and prairies	To determine the effectiveness of management in protecting and promoting the recovery of at-risk species dependent on barrens and glades.		See appendix for at-risk species associated with this ecological condition.
15 Upland and oak-hickory forests	To determine the effectiveness of management in protecting and promoting the recovery of at-risk species dependent on dry-upland forest habitats.		See appendix for at-risk species associated with this ecological condition.
16 Dry-mesic and mesic hardwood forests	To determine the effectiveness of management in protecting and promoting the recovery of at-risk species dependent on dry-upland forest habitats.		See appendix for at-risk species associated with this ecological condition.
17 Wetlands, swamps, forested wetlands, floodplain forests, caves	To determine the effectiveness of management in protecting and promoting the recovery of at-risk species dependent on dry-upland forest habitats.		See appendix for at-risk species associated with this ecological condition.

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18 Streams	To determine the effectiveness of management in protecting and promoting the recovery of at-risk species dependent on stream habitats.		See appendix for at-risk species associated with this ecological condition.
19 Openlands	To determine the effectiveness of management in protecting and promoting the recovery of at-risk species dependent on openlands.		See appendix for at-risk species associated with this ecological condition.
20 Cliffs	To determine the effectiveness of management in protecting and promoting the recovery of at-risk species dependent on openlands cliff habitats.		See appendix for at-risk species associated with this ecological condition.
21 Seeps, springs, caves	To determine the effectiveness of management in protecting and promoting the recovery of at-risk species dependent on openlands -seep, spring, and cave habitats.		See appendix for at-risk species associated with this ecological condition.
V. STATUS OF VISITOR USE, VISITOR SATISFACTION, AND PROGRESS TOWARD MEETING RECREATION OBJECTIVES			
22 Recreation demand	To determine if recreational user needs are met, if responsive to future recreation trends, and protective of resources	Are recreational users satisfied with their experience?	NVUM, user satisfaction, RSA
23 Recreation facility health and safety	To determine if recreational facilities (structures, excluding trails) provide adequate health and safety for visitors	Are facilities managed to standard?	Facility Survey, deferred maintenance list
24 Level of use of trail system	To determine if use-level is appropriate to protect resources and manage user encounters	Is usage consistent with planned usage?	Trail Survey, NVUM
25 Wilderness management	To determine if visitor experience needs (primitive recreation, solitude), biophysical requirements, and goals for management presence are being met	Are wilderness users satisfied with their experience?	NVUM, user satisfaction, NNIS Inventory

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VI. MEASURABLE CHANGES IN THE PLAN AREA RELATED TO CLIMATE CHANGE AND OTHER STRESSORS			
26 Long-term stream temperature monitoring	To determine if stream temperatures are changing over time.	Are stream temperatures changing?	Stream-temperature survey data
27 Invasive species control	To determine natural areas are being protected from invasive species.	Are we losing biodiversity in our natural areas from invasive species?	Natural Area Surveys
VII. PROGRESS TOWARD MEETING FOREST PLAN DESIRED CONDITIONS AND OBJECTIVES, INCLUDING PROVIDING MULTIPLE-USE OPPORTUNITIES			
28 Quantitative performance, comparing outputs / services with those projected in the Plan	To compare anticipated/projected and actual accomplishments	Is the plan being implemented?	Land Managed (Acres)
29 Species of recreational interest	To determine how Forest management affects species of recreational interest		Species of recreational interest
30 Heritage Resources	To determine how Forest management affects heritage resources.	Are heritage resources being protected?	Sites protected
VIII. EFFECTS OF (TIMBER) MANAGEMENT SYSTEMS TO DETERMINE THEY DO NOT SUBSTANTIALLY AND PERMANENTLY IMPAIR PRODUCTIVITY OF THE LAND			
31 Timber Harvest Program	To determine if timber program is accomplishing its' objectives while protecting soil productivity.	Is soil productivity being protected?	Soil Survey

Appendix

Species of Select Sets of Ecological Conditions (Section IV)

14 Barrens, glades, and prairies

American bluehearts (*Buchnera americana*)
Hyssopleaf thoroughwort (*Eupatorium hyssopifolium* var. *hyssopifolium*)
Plain gentian (*Gentiana alba*)
Crested coralroot (*Hexalectris spicata*)
Sunbright (*Phemeranthus parviflorus*)
Procession flower (*Polygala incarnate*)
Fewflower nutrush (*Scleria pauciflora*)
Spring lady's tresses (*Spiranthes vernalis*)
Whorled rosinweed (*Silphium trifoliatum*)

15 Upland and oak-hickory forests

Scarlet tanager (*Piranga olivacea*)
Wood thrush (*Hylocichla mustelina*)
Worm-eating warbler (*Helmitheros vermivorum*)
Timber rattlesnake (*Crotalus horridus*)
Eastern woodrat (*Neotoma floridana*)
American barberry (*Berberis canadensis*)
Porter's reedgrass (*Calamagrostis porter* ssp. *insperata*)
Fibrousroot sedge (*Carex communis*)
Ravenel's rosette grass (*Dichanthelium ravenelii*)
Buffalo clover (*Trifolium reflexum*)
Deerberry (*Vaccinium stamineum*)

16 Dry-mesic and mesic hardwood forests

Indiana bat (*Myotis sodalis*)
Northern long-eared bat (*Myotis septentrionalis*)
Mead's milkweed (*Asclepias meadii*)
Appalachian bugbane (*Actaea rubifolia*)
Black edge sedge (*Carex nigromarginata*)
Sharpscale sedge (*Carex oxylepis* var. *pubescens*)
Willdenow's sedge (*Carex willdenowii*)
Fairywand (*Chamaelirium luteum*)
Kentucky yellowwood (*Cladrastis kentukea*)
Greater yellow lady's slipper (*Cypripedium parviflorum* var. *pubescens*)
Goldie's woodfern (*Dryopteris goldiana*)
Bursting-heart (*Euonymus americanus*)
Turk's-cap lily (*Lilium superbum*)
Illinois woodsorrel (*Oxalis illinoensis*)
American ginseng (*Panax quinquefolia*)
Grove bluegrass (*Poa alsodes*)

Small's blacksnakeroot (*Sanicula smallii*)
Early saxifrage (*Saxifraga virginensis*)
Littlehead nutrush (*Scleria oligantha*)
Blue Ridge catchfly (*Silene ovata*)
Star chickweed (*Stellaria pubera*)
Bigleaf snowbell (*Styrax grandifolius*)
Guyandotte beauty (*Synandra hispidula*)
Threebirds (*Triphora trianthophora*)

17 Wetlands, swamps, forested wetlands, floodplain forests, caves

Indiana bat (*Myotis sodalist*)
Northern long-eared bat (*Myotis septentrionalis*)
Southeastern myotis (*Myotis austroriparius*)
Bird-voiced treefrog (*Hyla avivoca*)
Eastern narrow-mouth toad (*Gastrophryne carolinensis*)
Illinois chorus frog (*Pseudacris illinoensis*)
Anomalous spring amphipod (*Crangonyx anomalus*)
Packard cave amphipod (*Crangonyx packardi*)
Bousfield's amphipod (*Gammarus bousfieldi*)
Cave-obligate planarian (*Sphalloplana mohri*)
Flat-headed snake (*Tantilla gracilis*)
Bantam sunfish (*Lepomis symmetricus*)
Redspotted sunfish (*Lepomis miniatus*)
Cerulean warbler (*Dendroica cerulea*)
Swainson's warbler (*Limnothlypis swainsonii*)
Northern copperbelly watersnake (*Nerodia erythrogaster neglecta*)
Alligator snapping turtle (*Macrochelys temminckii*)
Mississippi green watersnake (*Nerodia cyclopion*)
Subtle stygobromid (*Stygobromus subtilis*)
Shining false indigo (*Amorpha nitens*)
Nottaway Valley brome (*Bromus nottowayanus*)
Broadwing sedge (*Carex alata*)
Cypressknee sedge (*Carex decomposita*)
Giant sedge (*Carex gigantea*)
False hop sedge (*Carex lupuliformis*)
Low woodland sedge (*Carex socialis*)
Red turtlehead (*Chelone obliqua* var. *speciosa*)
Finger dogshade (*Cynosciadium digitatum*)
Variable panicgrass (*Dicanthelium commutatum*)
Yadkin panicgrass (*Dichanthelium dichotomum* subsp. *Yadkinense*)
Wolf's spikerush (*Eleocharis wolfii*)
Arkansas mannagrass (*Glyceria arkansana*)
Kidneyleaf mudplantain (*Heteranthera reniformis*)
American featherfoil (*Hotonia inflata*)

Oneflower false fiddleleaf (*Hydrolea uniflora*)
Butternut (*Juglans cinerea*)
Palegreen orchid (*Platanthera flava* var. *flava*)
Grove bluegrass (*Poa alsodes*)
Clustered beakrush (*Rhynchospora glomerata*)
Leafy bulrush (*Scirpus polyphyllus*)
Eastern featherbells (*Stenanthium gramineum*)
American snowbell (*Styrax americanus*)
Pale false mannagrass (*Torreyochloa pallida*)
Heartleaf nettle (*Urtica chamaedryoides*)

18 Streams

Fanshell mussel (*Cyprogenia stegaria*)
Fat pocketbook mussel (*Potamilus capax*)
Pink mucket mussel (*Lampsilis orbiculata*)
Orange-footed pearly mussel (*Plethobasus cooperianus*)
Indiana crayfish (*Orconectes indianensis*)
Kentucky crayfish (*Orconectes kentuckiensis*)
Bigclaw crayfish (*Orconectes placidus*)
Black sandshell (*Ligumia recta*)
Purple lilliput (*Toxolasma lividum*)
Heartleaf plantain (*Plantago cordata*)
Sand grape (*Vitis rupestris*)

19 Openlands

Henslow's sparrow (*Ammodramus henslowii*)
Migrant loggerhead shrike (*Lanius ludovicianus migrans*)
Northern bobwhite (*Colinus virginianus*)
Yellow-breasted chat (*Icteria virens*)

20 Cliffs

Carinate pillsnail (*Euchemotrema hubrichti*)
Bradley's spleenwort (*Asplenium bradleyi*)
Blackstem spleenwort (*Asplenium resiliens*)
Eastern hayscented fern (*Dennstaedtia punctilobula*)
French's shooting-star (*Dodecatheon frenchii*)
Rock clubmoss (*Huperzia porophila*)
Allegheny stonecrop (*Hylotelephium telephioides*)
Limber honeysuckle (*Lonicera dioica*)
Yellow honeysuckle (*Lonicera flava*)
Appalachian bristle fern (*Trichomanes boschianum*)

21 Seeps, Springs, Caves

Short-tail batrachid (*Batrachus brachycaudus*)

Cave-obligate isopods (*Caecidotea beattyi*, *C. bicrenata whitei*)

Bousfield's amphipod (*Gammarus bousfieldi*)

Twining screwstem (*Bartonia paniculata*)

Prickly bog sedge (*Carex paniculata*)

Brome-like sedge (*Carex bromoides*)

Drooping sedge (*Carex prasina*)

Swamp sunflower (*Helianthus angustifolius*)

Large whorled pogonia (*Isotria verticillata*)

Small green wood orchid (*Platanthera clavellata*)

Maryland meadowbeauty (*Rhexia mariana*)

Sullivant's coneflower (*Rudbeckia fulgida* var. *speciosa*)

Longbeak arrowhead (*Sagittaria australis*)

Leafy bulrush (*Scirpus polyphyllus*)

New York fern (*Thelypteris noveboracensis*)